

Puget Sound Air Pollution Control Agency

HEREBY ISSUES AN ORDER OF APPROVAL
TO CONSTRUCT, INSTALL, OR ESTABLISH

Notice of
Construction No. 3264

Date JUL 14 1989

Upgrade Glass Furnace No. 4 with electrical boost.

A
P
P
L
I
C
A
N
T

Marvin C Gridley, Ball-InCon Glass Packaging Corp
5801 E MARGINAL WAY S
SEATTLE WA 98134-2497

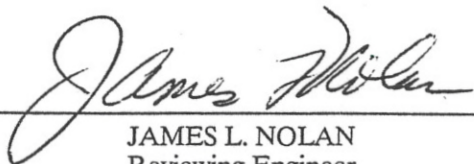
O BALL-INCON GLASS PACKAGING CORP
W
N 5801 E MARGINAL WAY S
E
R SEATTLE WA 98134-2497

INSTALLATION ADDRESS

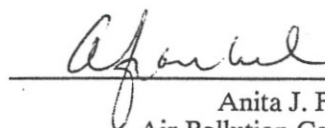
BALL-INCON GLASS PACKAGING CORP, 5801 E MARGINAL WAY S, SEATTLE, WA, 98134-2497

THIS ORDER IS ISSUED SUBJECT TO THE FOLLOWING RESTRICTIONS AND CONDITIONS

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Air Pollution Control Agency to the applicant to install, alter or establish the equipment, device or process described hereon at the INSTALLATION ADDRESS in accordance with the plans and specifications on file in the Engineering Division of PSAPCA.
2. Compliance with this ORDER and its conditions does not relieve the owner or operator from the responsibility of compliance with Regulations I or II, RCW 70.94 or any other emission control requirements, nor from the resulting liabilities and/or legal remedies for failure to comply.
3. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.


JAMES L. NOLAN
Reviewing Engineer

HW


Anita J. Frankel
Air Pollution Control Officer

Notice of Completion

WARNING:

11656 ✓

Regulation I, Section 6.09(a), requires that the owner or applicant notify the Agency of the completion of the work covered by the application and when its operation will begin. This form is provided for your convenience to assist you in complying with this part of the Regulation.

APPLICANT or OWNER SECTION

Mail to: Puget Sound Air Pollution Control Agency
Plan Review Section
200 West Mercer Street, Room 205
Seattle, Washington 98110-3958

RECEIVED

APR 4 1990

**PUGET SOUND AIR POLLUTION
CONTROL AGENCY**

Gentlemen:

The project described below was completed on March 30, 1990 and will be in operation
on March 30, 1990.

McGindley
Signature of Owner and/or Applicant

PROJ. ENG.
Title

4/3/90
Date

AGENCY USE ONLY

Notice of Construction No. 3264

Project Description

Upgrade Glass Furnace No. 4 with electrical boost.

☐ Conditions On
Reverse Side

Applicant

Marvin C Gridley, Ball-InCon Glass Packaging Corp
5801 E MARGINAL WAY S, SEATTLE, WA, 98134-2497

Owner

BALL-INCON GLASS PACKAGING CORP
5801 E MARGINAL WAY S, SEATTLE, WA, 98134-2497

Location

BALL-INCON GLASS PACKAGING CORP, 5801 E MARGINAL WAY S, SEATTLE, WA, 98134-2497

☐ Inspector check

☒ Engineer JLN

Dave

and Inspector check

Follow-up _____ (Estimated completion Date Plus 7)

Date Inspected 12/11/90 Inspector _____

REMARKS Since the boost, they claim the waste emissions
are down the air feed is down and the grain
loading has changed for the better

☒ See Attachment



PUGET SOUND AIR POLLUTION CONTROL AGENCY

ENGINEERING DIVISION

200 WEST MERCER, ROOM 205, SEATTLE, WASHINGTON 98119-3958
(206) 344-7334

#4

Notice of Construction and Application for Approval

FORM P
SIDE 1

Be sure to complete items 39, 40, 41, & 43 before submitting Form P.

DATE 07/20/89 (AGENCY USE ONLY)
REG. NO. 11655 N/C NUMBER 3264
SIC. NO. 11655 VAR. NO. _____
GRID NO. _____ COS. NO. _____
UTM _____

1. TYPE OF BUILDING (Check) <input type="checkbox"/> New <input checked="" type="checkbox"/> Existing	2. STATUS OF EQUIPMENT (Check) <input type="checkbox"/> New <input checked="" type="checkbox"/> Existing <input type="checkbox"/> Altered <input type="checkbox"/> Relocation	7. APPLICANT Same
3. COMPANY (OR OWNER) NAME Ball-InCon Glass Packaging Corp.		8. APPLICANT ADDRESS Same
4. COMPANY (OR OWNER) MAILING ADDRESS 5801 East Marginal Way South		9. INSTALLATION ADDRESS Same
5. NATURE OF BUSINESS Glass Container Manufacture		10. TYPE OF PROCESS Glass melting and forming

EQUIPMENT (ENTER ONLY NEW EQUIPMENT OR CHANGES. ENTER NUMBER OF UNITS OF EQUIPMENT IN COLUMN 'NO. OF UNITS.' COMPLETE FORM 'S' FOR EACH ENTRY.)

11. NO. OF UNITS	SPACE HEATERS OR BOILERS (Complete Form S-A)	14. NO. OF UNITS	OVENS	15. NO. OF UNITS	MECHANICAL EQUIP.	16. NO. OF UNITS	MELTING FURNACES
(a) _____		(a) _____	CORE BAKING OVEN	(a) _____	AREAS	(a) _____	POT
12. NO. OF UNITS	INCINERATORS (Complete Form S-B)	(b) _____	PAINT BAKING	(b) _____	BULK CONVEYOR	(b) _____	REVERBERATORY
(a) _____		(c) _____	PLASTIC CURING	(c) _____	CLASSIFIER	(c) _____	ELECTRIC INDUC/RESIST
13. NO. OF UNITS	OTHER SYSTEMS	(d) _____	LITHO COATING OVEN	(d) _____	STORAGE BIN	(d) _____	CRUCIBLE
(a) _____	DEGREASING, SOLVENT	(e) _____	DRYER	(e) _____	BAGGING	(e) _____	CUPOLA
(b) _____	ABRASIVE BLASTING	(f) _____	ROASTER	(f) _____	OUTSIDE BULK STORAGE	(f) _____	ELECTRIC ARC
(c) _____	OTHER - SYSTEM	(g) _____	KILN	(g) _____	LOADING OR UNLOADING	(g) _____	SWEAT
(d) _____		(h) _____	HEAT-TREATING	(h) _____	BATCHING	(h) _____	OTHER METALLIC
		(i) _____	OTHER	(i) _____	MIXER (SOLIDS)	(i) <u>1</u>	GLASS #4 furnace
		(j) _____		(j) _____	OTHER	(j) _____	OTHER NON METALLIC
17. NO. OF UNITS	GENERAL OPER. EQUIP.	17. NO. OF UNITS	GENERAL OPER. EQUIP.	17. NO. OF UNITS	GENERAL OPER. EQUIP.	18. NO. OF UNITS	OTHER EQUIPMENT
(a) _____	CHEMICAL MILLING	(f) _____	GALVANIZING	(k) _____	ASPHALT BLOWING	(a) _____	SPRAY PAINTING GUN
(b) _____	PLATING	(g) _____	IMPREGNATING	(l) _____	CHEMICAL COATING	(b) _____	SPRAY BOOTH OR ROOM
(c) _____	DIGESTER	(h) _____	MIXING OR FORMULATING	(m) _____	COFFEE ROASTER	(c) _____	FLOW COATING
(d) _____	DRY CLEANING	(i) _____	REACTOR	(n) _____	SAWS & PLANERS	(d) _____	FIBERGLASSING
(e) _____	FORMING OR MOLDING	(j) _____	STILL	(o) _____	STORAGE TANK	(e) _____	OTHER

CONTROL DEVICES (ENTER NUMBER OF UNITS OF EQUIPMENT IN SPACES IN COLUMNS. COMPLETE A FORM R FOR EACH ENTRY.)

19. NO. OF UNITS	CONTROL DEVICE	20. NO. OF UNITS	CONTROL DEVICE	21. NO. OF UNITS	CONTROL DEVICE	22. NO. OF UNITS	CONTROL DEVICE
(a) _____	SPRAY CURTAIN	(a) _____	AIR WASHER	(a) _____	ABSORBER	(a) _____	DEMISTER
(b) _____	CYCLONE	(b) _____	WET COLLECTOR	(b) _____	ADSORBER	(b) _____	BAGHOUSE
(c) _____	MULTIPLE CYCLONE	(c) _____	VENTURI SCRUBBER	(c) _____	FILTER PADS	(c) _____	ELEC. PRECIPITATOR
(d) _____	INERTIAL COLL. - OTHER	(d) _____		(d) _____	AFTERBURNER	(d) _____	OTHER

23. BASIC EQUIPMENT COST (Estimate) 129,000	24. CONTROL EQUIPMENT COST (Estimate)	25. DAILY HOURS FROM _____ AM to _____ PM 24	26. DAYS OF OPERATION (Circle) (S) (M) (T) (W) (T) (F) (S)
27. ESTIMATED STARTING DATE OF CONSTRUCTION: December, 1989		28. ESTIMATED COMPLETION DATE OF CONSTRUCTION: December, 1989	

29. RAW MATERIALS (List starting material used in process) AND FUELS (Type and amount) *	ANNUAL AMT. Tons UNITS	30. PRODUCTS (List End Products)	ANNUAL PROD. Tons UNITS
(a) _____	24,300	(a) Glass containers	42,000
(b) Soda Ash	7,550	(b) _____	
(c) Limestone	6,300	(c) _____	
(d) Salt Cake	114	(d) _____	
(e) Carbocite	15	(e) _____	
(f) Iron Chromite	36	(f) _____	
(g) Selenium	54 lb.	(g) *See attached	

Notice of Construction Application

FORM P

STACKS OR VENTS (LIST NUMBER, TYPE, AND SIZE OF VENT)

31. NO. OF UNITS	DESCRIPTION OF OPENING	32. HEIGHT ABOVE GRADE (FT.)	33. VOLUME EXHAUSTED (ACFM)	DIMENSIONS (INCHES)	
				34. LENGTH (OR DIAM)	35. WIDTH
(a) 1	STACKS	70	28,000	40.75" diam.	
(b)	FLUES				
(c)	PROCESS OR GENERAL EXHAUST				
(d)	PROCESS OR GENERAL VENTS				
(e)	SKYLIGHT OR WINDOW				
(f)	EXHAUST HOOD				
(g)	OTHER				

FLOW DIAGRAM

36. FLOW DIAGRAM INSTRUCTIONS: Attached

- (a) FLOW DIAGRAM MAY BE SCHEMATIC. ALL EQUIPMENT SHOULD BE SHOWN WITH EXISTING EQUIPMENT SO INDICATED.
- (b) SHOW FLOW DIAGRAM OF PROCESS STARTING WITH RAW MATERIALS USED AND ENDING WITH FINISHED PRODUCT.
- (c) IF MORE THAN ONE PROCESS IS INVOLVED TO MAKE FINISHED PRODUCT, SHOW EACH PROCESS AND WHERE THEY MERGE.
- (d) INDICATE ALL POINTS IN PROCESS WHERE GASEOUS OR PARTICULATE POLLUTANTS ARE EMITTED.
- (e) FLOW CHART CAN BE ATTACHED SEPARATELY IF NECESSARY. (DRAWINGS MAYBE SUBMITTED INSTEAD IF DESIRED).
- (f) SHOW PICKUP AND DISCHARGE POINTS FOR HANDLING OR CONVEYING EQUIPMENT.

7. LIST OF ATTACHMENTS AND ACCOMPANYING DATA OR COMMENTS:

Form S	Schedule of Equipment	Furnace Drawings
Flow Diagram	Emission Estimate	
Raw Materials and Fuels	Process/Furnace Description	
Plans/Specs	Tables 1, 2, 4, 21	

8. CERTIFICATION:

I, THE UNDERSIGNED, DO HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS APPLICATION AND THE ACCOMPANYING FORMS, PLANS, AND SUPPLEMENTAL DATA DESCRIBED HEREIN IS, TO THE BEST OF MY KNOWLEDGE, ACCURATE AND COMPLETE.

39. SIGNATURE <i>McGriddle</i>	40. DATE 6-29-89
41. TYPE OR PRINT NAME MARVIN C. GRIDLEY	42. TITLE PROTECT ENGINEER
	43. PHONE (317) 741-7145

Ball-InCon Glass Packaging Corp.
Seattle, Washington

Form P - #4 Furnace

29. Raw materials (con't.)

Powder Blue	375 lb.
Iron Pyrites	19 tons
Cobalt Oxide	200 lb.
Nickel Oxide	2000 lb.

Fuel

Natural Gas	-	168,000 MCF
Electric Boost	-	9,000 M KWH

PUGET SOUND AIR POLLUTION CONTROL AGENCY

ENGINEERING DIVISION

200 WEST MERCER STREET •

• SEATTLE, WASHINGTON 98109 • (206) 296-7334

*Glass
furnace
modification*

Notice of Construction and Application for Approval

*Note: Information required by Section 1a must be completed, for this form to be accepted for review.

FOR BASIC PROCESS EQUIPMENT

PLEASE CONSULT INSTRUCTION SHEET BEFORE FORWARDING

FORM S

DATE June 27, 1989

a. COMPLETE THE SECTIONS INDICATED ☒ 1 ☒ 2 ☒ 3 ☒ 4 ☒ 5 ☒ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☒ 12

c. COMPANY (OR OWNER) NAME
Ball-InCon Glass Packaging Corp.

b. COMPANY (OR OWNER) INSTALLATION ADDRESS
5801 East Marginal Way South

d. APPLICANT
Same

e. PREPARED BY: (Name and title)
M. C. Gridley, Proj. Eng.

f. PREPARED BY: (Signature)
M. C. Gridley

g. PHONE
317/741-7145

a. **PROCESS EQUIPMENT DATA**

b. Title
No. 4 Glass Furnace

c. Make and Model
Ball-InCon

d. Dimensions (LxWxH)
27'-6" x 16' x 45"

e. No. of units; rated capacity
1

f.
135 tons/day

g. Auxiliary Equipment
Electric boost

h. Connected To:

a. **BURNER DATA**

b. Type of Burner, Fuel
Combustion Tech, gas/oil

c. Make and Model
03RF-MS-300-1469-15

d. Rated Capacity
12 MM Btu/hr

e. No. of units; ignition method
4

f.
23,000 @ 2800°F (°F)

g. CFM Exhausted (Temperature)

h. Connected To:

a. **STACKS, VENTS AND EXHAUST OPENINGS**

b. Type of Vent
Stack

c. Dimensions
40.75" diam

d.
70 ft. high

e. No. of vents; Material of construction
1

f.
Steel

g. CFM Exhausted (Temperature)
28,000 @ 480°F (°F)

h. Connected To:

a. **TANKS AND KETTLES**

b. Type of Tank, Material

c. Dimensions (LxWxH) in inches

d. Surface Area (Sq. Ft.)
☐ Closed ☐ Open

e. No. of tanks; Material of construction

f.
g. Auxiliary Equipment

h. Connected To:

a. **FAN DATA**

b. Type of Fan (Designate Blade)

c. Make and Model

d. Motor Data
RPM HP

e. No. of fans; Material of construction

f.
g. CFM Exhausted (Temperature)
(°F)

h. Connected To:

a. **OVENS AND FURNACES**

b. Type of Oven or Furnace
End-Port Regenerative

c. Make and Model
Ball-InCon

d. Rated Capacity
135 tons/day

e. No. of ovens; Material of construction
1

f.
Refractory

g. CFM Exhausted (Temperature)
28,000 @ 480°F (°F)

h. Connected To:

a. **OPERATIONAL DATA**

b. Type of Operation
☐ Batch ☒ Continuous

c. Operating Schedule (Normal)
7 d/wk
SHIFTS/DAY ☐ 1 ☐ 2 ☒ 3

d. Mode of Operations
☐ Manual ☐ Auto ☒ Semi-Auto

e. Duration of Batch (Hrs/Batch)

f.
g. Daily Number of Batches
43 (Ave) 47 (Max)

h.

a. **CONVEYOR DATA**

b. Type of Conveyor
(Pneumatic, Bolt)

c. Make and Model

d. Capacity

e. Dimensions (LxWxH)

f.
g. No. of Pickups No. of Discharge Pts

h. Connected To:

GAS FLOW

b. ACTUAL CFM

c. SCFM (Reg I Standard)

d. TEMPERATURE (°F)
IN _____ OUT _____

e. PRESSURE DROP

f. EFFICIENCY

g. INLET AND OUTLET POLLUTANT CONCENTRATIONS

h.

a. **ADDITIONAL DATA**

b. ☐ ATTACH BROCHURE

c. ☒ ATTACH PLANS/SPECS

d. ☒ ATTACH EMISSION ESTIMATE (show calculations)

e. ☒ SUBMIT NARRATIVE DESCRIPTION OF PROCESS

f. ☐ SUBMIT SOURCE TEST DATA

g. ☐ SUBMIT MODELING DATA

h. ☒ ATTACH A SCHEDULE OF EQUIPMENT WITH MAKE, MODEL, CAPACITY

i. ☐ before & after

j. ☒ Complete tables 1, 2 & 3 before & after

k. ☐

l. ☐

*before & after
modifications*

**TABLE 1
EMISSION SOURCES**

List all sources, including this application, of air contaminants on applicant's property. If applicant has submitted this information in an earlier emission inventory, it will not be necessary to duplicate the requested information. Instead, indicate that this page has been submitted and list only changes from the emission inventory and list new source data.

ALL SOURCES

EMISSION POINT NUMBER from plot plan	LIST POLLUTANT EMISSIONS (CHEMICAL COMPOSITION) & WT. OF EACH	FLOW RATE OF EACH LISTED EMISSION	
		GASEOUS	PARTICULATE
Existing			
#4	95% Na ₂ SO ₄		3.6 lb/hr.
	5% CaSO ₄		
With additional electric boost			
#4	95% Na ₂ SO ₄		1.4 lb/hr.
	5% CaSO ₄		

STACKS ONLY

EMISSION POINT NUMBER from plot plan	STACK HEIGHT ABOVE GROUND (ft.)	STACK INTERNAL DIAMETER AT EXIT (ft.)	TEMP. DEG. (F)	VELOCITY (FT/SEC)	MOIS. %
4	70	3.4	480	51.5	5
4	70	3.4	400	45	5

ENCLOSE THE FOLLOWING INFORMATION:

1. EMISSIONS OTHER THAN THROUGH STACKS (HORIZONTAL VENTS, ETC.)
2. STACK'S HEIGHT ABOVE SUPPORTING OR ADJACENT STRUCTURES.
3. DIMENSIONS OF NON-CIRCULAR STACKS.
4. RESULTS OF TESTS INDICATING AVERAGE PARTICLE SIZE, DENSITY, ETC.

TABLE 2

#4 Furnace

MATERIAL BALANCE

A material balance table is used to quantify possible emissions of air contaminants and special emphasis should be placed on potential air contaminants, for example: If feed contains sulfur, show distribution to all products. Please relate each material (or group of materials) listed to its respective location in the process flow diagram by assigning point numbers (taken from the flow diagram) to each material.

LIST EVERY MATERIAL INVOLVED IN EACH OF THE FOLLOWING GROUPS	Point No. from Flow Diagram	Process Rate (lbs/hr or SCFM) standard conditions: 70°F 14.7 PSIA. Check appropriate column at right for each process.	Measurement	Estimation	Calculation
1. Raw Materials - Input Salt Cake Iron Pyrites	4	Existing-Salt Cake-55 lb/hr. Iron Pyrites- 9.3 lb/hr. <u>With additional electric boost-</u> no change			X X
2. Fuels - Input					
3. Products & By-Products - Output					
4. Solid Wastes - Output					
5. Liquid Wastes - Output					
6. Airborne Waste (Solid) - Output Particulate matter	4	Existing - 3.6 lb/hr. <u>With additional electric boost</u> 1.4 lb/hr.	X	X	
7. Airborne Wastes (Gaseous) - Output					

#4 - Existing Furnace

TABLE 4
COMBUSTION UNITS

OPERATIONAL DATA				
Number from flow diagram:		4	Model Number (if available):	
Name of device:		No. 4 Glass Melting Furnace		Manufacturer: Ball-InCon
CHARACTERISTICS OF INPUT				
Waste Material*	Chemical Composition			
	Material	Min. Value Expected lb/hr	Ave. Value Expected lb/hr	Design Maximum lb/hr
	1.			
	2.			
	3.			
	4.			
	5.			
Gross Heating Value of Waste Material (Wet basis if applicable)	Btu/lb	Air Supplied for Waste Material	Minimum SCFM (70°F & 14.7 psia)	Maximum SCFM (70°F & 14.7 psia)
Waste Material or Contaminated Gas	Total Flow Rate lb/hr		Inlet Temperature °F	
	Minimum Expected	Design Maximum	Minimum Expected	Design Maximum
Fuel	Chemical Composition			
	Material	Min. Value Expected lb/hr	Ave. Value Expected lb/hr	Design Maximum lb/hr
	1. Nat. Gas		20,300 cfh	27,000 cfh
	2.			
	3.			
	4.			
Gross Heating Value of Fuel	Btu/cf 1034	Air Supplied for Fuel	Minimum SCFM (70°F & 14.7 psia) 3700	Maximum SCFM (70°F & 14.7 psia) 4900

*Describe how waste material is introduced into combustion unit on an attached sheet. Supply drawings, dimensioned and to scale to show clearly the design and operation of the unit.

(over)



4 Furnace - with additional
electric boost

TABLE 4

COMBUSTION UNITS

OPERATIONAL DATA				
Number from flow diagram: 4		Model Number (if available):		
Name of device: No. 4 Glass Melting Furnace		Manufacturer: Ball-InCon		
CHARACTERISTICS OF INPUT				
Waste Material*	Chemical Composition			
	Material	Min. Value Expected lb/hr	Ave. Value Expected lb/hr	Design Maximum lb/hr
	1.			
	2.			
	3.			
	4.			
	5.			
Gross Heating Value of Waste Material (Wet basis if applicable)	Btu/lb	Air Supplied for Waste Material	Minimum SCFM (70°F & 14.7 psia)	Maximum SCFM (70°F & 14.7 psia)
Waste Material or Contaminated Gas	Total Flow Rate lb/hr		Inlet Temperature °F	
	Minimum Expected	Design Maximum	Minimum Expected	Design Maximum
Fuel	Chemical Composition			
	Material	Min. Value Expected lb/hr	Ave. Value Expected lb/hr	Design Maximum lb/hr
	1. Nat. Gas		14,300 cfh	27,000 cfh
	2.			
	3.			
	4.			
Gross Heating Value of Fuel	Btu/lb cf 1034	Air Supplied for Fuel	Minimum SCFM (70°F & 14.7 psia) 2700	Maximum SCFM (70°F & 14.7 psia) 4900

*Describe how waste material is introduced into combustion unit on an attached sheet. Supply drawings, dimensioned and to scale to show clearly the design and operation of the unit.

(over)

TABLE 4
(continued)
COMBUSTION UNITS

CHARACTERISTICS OF OUTPUT				
Flue Gas Released	Chemical Composition			
	Material	Min. Value Expected lb/hr	Ave. Value Expected lb/hr	Design Maximum lb/hr
	1. Carbon Dioxide		3,000	
	2. Oxygen		8,900	
	3. Water Vapor		1,500	
	4. Nitrogen		35,000	
	5.			
Temperature at Stack Exit OF	Total Flow Rate		Velocity at Stack Exit	
<u>400</u>	Avg. 49,000	lb/hr	Avg. 45	ft/sec
	Minimum Expected	Maximum Expected	Minimum Expected	Maximum Expected
COMBUSTION UNIT CHARACTERISTICS				
Chamber Volume from Drawing ft³	Chamber Velocity at Average Chamber Temperature		Average Chamber Temperature	
<u>2,000</u>	ft/sec		OF	
	<u>8</u>		<u>2,720</u>	
Average Residence Time sec	Exhaust Stack Height		Exhaust Stack Diameter	
<u>7.0</u>	ft		ft	
	<u>70</u>		<u>3.4</u>	
ADDITIONAL INFORMATION FOR CATALYTIC COMBUSTION UNITS				
Number and Type of Catalyst Elements	Catalytic Bed Velocity		Max. Flow Rate per Catalytic Unit	
	ft/sec		(Manufacturer's Specifications)	
			Specify Units	

Attach separate sheets as necessary providing a description of the combustion unit, including details regarding principle of operation and the basis for calculating its efficiency. Supply an assembly drawing, dimensioned and to scale, to show clearly the design and operation of the equipment. If the device has bypasses, safety valves, etc., specify when such bypasses are to be used and under what conditions. Submit explanations on controls for temperature, air flow rates, fuel rates, and other operating variables.

**TABLE 21
FURNACE DATA SHEET**

Number from flow diagram No. 4 - Existing		Furnace Type		
Furnace Manufacturer Ball-InCon		<input type="checkbox"/> Electric <input type="checkbox"/> Arc <input type="checkbox"/> Reverberatory <input type="checkbox"/> Channel <input type="checkbox"/> Crucible <input type="checkbox"/> Coreless <input type="checkbox"/> Pot <input type="checkbox"/> <input type="checkbox"/> Annealing or HT <input type="checkbox"/> Cupola <input type="checkbox"/> Reheat <input type="checkbox"/> Retort <input type="checkbox"/> Blast <input checked="" type="checkbox"/> Other End-Port Regenerative		
Model Number				
Size (Dimensions) 27.5' x 26' x 45"				
FURNACE OPERATION				
Metal Type Melted Glass		Type Heat Additives		
Melting Capacity (tons/hr.) 5.63		Qty. of Heat Additives		
Holding Capacity (tons) 124		Pouring Temp. (°F) 2100		
Charge Makeup Sand, soda ash, limestone, fining agents, colorants		Afterburner (BTU/hr.)		
Charging Method Gana		Ductile Iron Prod. (tons/hr.)		
Oxygen Injection		Method Temp. Control		
		Tuyere Air (SCFM*)		
CHARACTERISTICS OF FUEL INPUT				
Fuel Type	Chemical Composition (% by Weight)	Inlet Air Temp. °F	Fuel Flow Rate (SCFM* or lb/hr.)	
Natural Gas		Ambient	Average 338 scfm	Design Max. 450 scfm
		Total Air Supplied (SCFM*)		Gross Heating Value of Fuel (specify units)
		3700		1034 Btu/ft ³
CHARACTERISTICS OF STACK OUTPUT				
Material Emitted	Chemical Composition and Rate of Release			
Particulate matter	95% sodium sulfate 5% calcium sulfate		3.6 lb/hr.	
STACK PARAMETERS				
Stack Diameter	Stack Height	Temp. °F	Velocity	Moisture %
5 in.	70 ft.	480	51.5 ft/sec	5

Also supply an assembly drawing, dimensions, and to scale, in as many sections as are needed to show clearly the operation of the furnace.

*STANDARD CONDITIONS: 70°F, 14.7 PSIA

**TABLE 21
FURNACE DATA SHEET**

Number from flow diagram No. 4 - with additional electric boost		Furnace Type	
Furnace Manufacturer Ball-InCon		<input type="checkbox"/> Electric	<input type="checkbox"/> Arc
Model Number		<input type="checkbox"/> Reverberatory	<input type="checkbox"/> Channel
Size (Dimensions) 27.5' x 16'x45"		<input type="checkbox"/> Crucible	<input type="checkbox"/> Coreless
		<input type="checkbox"/> Pot	<input type="checkbox"/>
		<input type="checkbox"/> Annealing or HT	<input type="checkbox"/> Cupola
		<input type="checkbox"/> Reheat	<input type="checkbox"/> Retort
		<input type="checkbox"/> Blast	<input checked="" type="checkbox"/> Other
		End-Port Regenerative	
FURNACE OPERATION			
Metal Type Melted Glass		Type Heat Additives	
Melting Capacity (tons/hr.) 5.63		Qty. of Heat Additives	
Holding Capacity (tons) 124		Pouring Temp. (°F) 2100	
Charge Makeup Sand, soda ash, limestone, fining agent, colorants g Method Gana		Afterburner (BTU/hr.)	
		Ductile Iron Prod. (tons/hr.)	
		Method Temp. Control	
Oxygen Injection		Tuyere Air (SCFM*)	
CHARACTERISTICS OF FUEL INPUT			
Fuel Type	Chemical Composition (% by Weight)	Inlet Air Temp. of	Fuel Flow Rate (SCFM* or lb/hr.)
Natural Gas		Ambient	Average 238 scfm
			Design Max. 450 scfm
		Total Air Supplied (SCFM*)	Gross Heating Value of Fuel (specify units)
		2700	1034 Btu/ft ³
CHARACTERISTICS OF STACK OUTPUT			
Material Emitted	Chemical Composition and Rate of Release		
Particulate matter	95% sodium sulfate 5% calcium sulfate		1.4 lb/hr
STACK PARAMETERS			
Stack Diameter	Stack Height	Temp. °F	Velocity
40.75 in.	70	400	45 ft/sec
			Moisture %
			5

Also supply an assembly drawing, dimensions, and to scale, in as many sections as are needed to show clearly the operation of the furnace.

*STANDARD CONDITIONS: 70°F, 14.7 PSIA

RECEIVED

JUN 30 1989

Ball-InCon
Glass Packaging Corp.
1509 South Macedonia Avenue
Muncie, IN 47302-3664
(317) 741-7000

Reply to: P.O. Box 4200
Muncie, IN 47307-4200

PUGET SOUND AIR POLLUTION
CONTROL AGENCY

June 29, 1989



VIA FEDERAL EXPRESS

Puget Sound Air Pollution Control Agency
200 West Mercer Street, Room 205
Seattle, Washington 98119

Attn: Anita J. Frankel, Air Pollution Control Officer

Re: Section 9.25(b) - Notification
Ball-InCon Glass Packaging Corp.
5801 East Marginal Way South
Seattle, WA 98134

Dear Ms. Frankel,

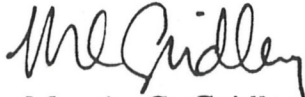
Attached is information submitted in compliance with Regulation I, Section 9.25(b), which documents the means by which the #4 and #5 glass melting furnaces at our Seattle facility will achieve compliance with the 0.05 gr/dscf standard of Section 9.09(c). The installation of additional electric boost capacity will involve minimal construction.

Please note that the proposed date for the #5 installation is December, 1990, which is after the July 1, 1990 start date specified in Section 9.25(d). For scheduling reasons, we request that an extension be granted to allow installation to be made in December, 1990. The additional transformer capacity for the #4 system will be installed this year, in advance of the July 1, 1990 requirement. As we have stated previously, this work can only be done when the furnaces are at an idle condition for a period of several days. Our only opportunity is during the holiday production curtailment between Christmas and New Years' Day, and there is time for the installation of only one system during that period. Thus we request an extension so that the #5 system can be installed during the December, 1990 holiday curtailment and meet the final compliance date of January 1, 1991.

We have completed the Environmental Checklist as requested, even though it is designed for proposals with adverse environmental impacts; our proposal will result in air quality improvements.

If there are any questions or further information is required, please call me at (317) 741-7145.

Sincerely,

A handwritten signature in black ink, appearing to read "McGridley".

Marvin C. Gridley
Project Engineer

Attachments

Ball-InCon Glass Packaging Corp.
Seattle, Washington

Form S, Item 12

C. Plans/Specifications

The existing fuel-fired furnaces (#3, #4, #5) each have 1000 KVA of installed electric boost capacity. Energy is introduced into the glass by way of electrodes inserted through the furnace sidewalls and immersed in the molten glass bath.

It is proposed to increase the electric boost transformers of #4 and #5 furnaces by an additional 1000 KVA for a total electric boost capability of 2000 KVA per furnace.

E. Description of the Glass Container Manufacturing Process

The major glass-making raw materials, consisting of sand, soda ash and limestone, along with lesser quantities of colorants and refining agents, are received by rail or truck and unloaded into storage silos until needed. Recycled glass, called cullet, from our own process (rejects) and purchased from recycling centers and other outside sources is also a major raw material. Batch materials in carefully weighed proportions are thoroughly mixed and conveyed to storage bins above the glass melting furnace. Mixed batch is continuously fed into one end of the glass melting furnace, which is essentially a refractory box constructed of special high-temperature resistant refractories, containing a bath of molten glass at a temperature of about 2500°F.

Of the five furnaces at the Seattle facility, two (#1 and #2) are heated entirely by electricity introduced by way of electrodes immersed in the molten glass and are capable of melting only clear glass. For the remaining three furnaces (#3, #4 and #5), most of the energy for melting and refining the glass is supplied by natural gas fired burners, with additional energy from electrodes immersed in the glass as with electric melting. Temperatures above the glass melt reach 2700 to 2800°F. The gas-fired furnaces are of the regenerative type, in which combustion products are exhausted into one of two chambers containing refractory brick for reclamation of heat; air for combustion passes through the other side and into the furnace to be mixed with fuel for heating the furnace. Every 15 minutes, the process is reversed, with the previously heated chamber now used to preheat combustion air and hot combustion products pass through the cooler side to again heat the refractory packing. Fuel flow and air/fuel ratio are controlled to maintain proper furnace temperatures and efficient combustion. Induced draft fans are used to aid

in exhausting gases, which contain a small concentration of particulate matter, through a stack to the atmosphere.

Chemical reactions occur at these high temperatures over a period of several hours to form glass. The refining process (removal of trapped gases and bubbles) and homogenization of the glass takes place both during and after melting. Nearly bubble-free glass is continually withdrawn from the other end of the furnace and flows through shallow refractory channels called forehearth to the forming machines where bottles and jars are made. The freshly formed containers are heat-treated to remove any stresses in the forming process, inspected, packed and shipped to our customers. This operation goes on 24 hours a day, 7 days a week, with a short break at Christmas during which production is curtailed but the furnaces remain near operating temperatures. The furnaces are only shut down at the time of a major repair for rebricking, typically every five to seven years.

Process Change

The proposed additional electric boost capacity will have the effect of decreasing the natural gas required, in turn lowering the furnace operating temperature. At a lower furnace temperature, a smaller quantity of particulate matter will be emitted to the atmosphere. The basic glass-making process remains unchanged.

H. Schedule of Equipment

Transformers and associated equipment to provide 2000 KVA of electric boost will be ordered and on site to meet the proposed installation schedule of December, 1989 for the #4 system and December, 1990 for the #5 system.

June 27, 1989

Ball-InCon Glass Packaging Corp.

Seattle, WA

FORM S - Item 12

D. Particulate emission calculations for #4 and #5 glass melting furnaces.

I. Existing furnace

	<u>Particulate (lb/hr.)</u>	<u>Basis</u>
#4	3.6	Stack test 6/5/86 (PSAPCA)
#5	5.8	Stack test 10/7/86 (PSAPCA)

II. Furnaces after proposed addition of 1000 KVA electric boost.

Particulate emissions are essentially a sodium sulfate condensate.

Emission rates are affected by a number of factors, but depend primarily on furnace temperature. The substitution of electric energy directly into the glass allows for a reduction in natural gas usage with a concurrent reduction in furnace operating temperature. The estimate of the emission reduction expected from the additional electric boost is based on this temperature reduction.

A) Fuel reduction

Electric energy added at the rate of 1000 kw/hr is equivalent to,

$$\frac{1000 \text{ KWH}}{\text{hr.}} \times \frac{3413 \text{ Btu}}{\text{KWH}} = 3.413 \text{ MM Btu/hr.}$$

We assume, for actual melting of glass, that boost energy is 100% efficient and gas is 50% efficient. The natural gas equivalent of 1000 KWH/hr boost is,

$$\frac{3.413 \text{ MM Btu/hr.}}{0.5} = 6.826 \text{ MM Btu/hr. from gas}$$

The fuel flow rate to provide this energy is,

$$\frac{6.826 \text{ MM Btu/hr.}}{1034 \text{ Btu/cu.ft.}} = 6602 \text{ cfh gas}$$

Use 6000 cfh natural gas as the equivalent of 1000 KWH/hr electric boost.

B) Temperature reduction

Operating data shows that these furnaces typically operate with a bridgewall temperature of 2820-2840°F, which is a measure of the temperature above the molten glass. In addition, data at reduced production rates shows that a reduction in fuel on the order of 6000 cfh results in a decrease in bridgewall temperature to 2720-2740°F, or about 100°F.

C) Particulate emissions

The results of tests conducted by another glass container manufacturer* showed about 16% reduction in particulate emissions for a 25°F reduction in bridgewall temperature. Actual results for a given furnace will be dependent on a number of factors, including operating temperature, production rate, furnace melter area, and percentage of cullet in the batch. For a decrease in bridgewall temperature of 100°F, a 64% decrease in particulate emissions would be indicated. Because of the dependence on these operating conditions, a 60% reduction in mass emissions will be used as a basis for estimating the effect of additional electric boost. Actual results may not agree exactly with the projected values, but we fully expect the furnaces equipped with additional electric boost to meet the 0.05 gr/dscf standard of Section 9.09 (c).

D) Emission estimates

No. 4 furnace

Results from PSAPCA test of 6/5/86:

Nat. Gas = 18,500 cfh

Mass Emissions = 3.59 lb/hr.

Grain Loading = 0.089 gr/dscf

$$\begin{array}{rcl} \text{Flow rate of flue gas} & = & 3.59 \frac{\text{lb}}{\text{hr}} \times 7000 \frac{\text{gr}}{\text{lb}} \\ & & \frac{0.089 \text{ gr}}{\text{dscf}} = 282,360 \text{ dscfh} \end{array}$$

* R. J. Ryder and J. J. McMackin, "Some Factors Affecting Stack Emissions from a Glass Container Furnace: Part I.", Glass Industry, 50 (6) 307-10 (1969); Part II, ibid., (7) 346-50.

This yields a combustion factor of $\frac{282,360}{18,500} = 15.3$

With an expected 60% reduction in mass emissions, the new emission rate is,

$$3.59 \frac{\text{lb}}{\text{hr}} \times 0.4 = 1.436 \text{ lb/hr.}$$

Using an average 1988 fuel usage of 20,300 cfh, the projected reduction of 6000 cfh gives a new fuel usage of,

$$20,300 - 6000 = 14,300 \text{ cfh gas}$$

With a combustion factor of 15.3, the estimated grain loading is,

$$\frac{1.436 \frac{\text{lb}}{\text{hr.}} \times 7000 \frac{\text{gr}}{\text{lb.}}}{15.3 \times 14,300 \text{ cfh gas}} = 0.046 \text{ gr/dscf}$$

This estimated grain loading meets the 0.05 gr/dscf requirement of Section 9.09 (c).

No. 5 Furnace

PSAPCA test results of 10/7/86:

Nat. Gas = 27,000 cfh

Mass Emissions = 5.79 lb/hr.

Grain Loading = 0.063 gr/dscf

$$\text{Flow rate of flue gas} = \frac{5.79 \frac{\text{lb}}{\text{hr}} \times 7000 \frac{\text{gr}}{\text{lb.}}}{0.063 \text{ gr/dscf}} = 643,300 \text{ dscfh flue gas}$$

$$\text{The combustion factor is } \frac{643,300 \text{ dscfh}}{27,000 \text{ cfh fuel}} = 23.8$$

At an expected 60% reduction in mass emissions, the new emission rate is,

$$5.79 \frac{\text{lb.}}{\text{hr.}} \times 0.4 = 2.316 \text{ lb/hr}$$

Using the average 1988 fuel usage of 25,700 cfh, the projected reduction in natural gas of 6000 cfh gives a new fuel usage of,

$$25,700 \text{ cfh} - 6000 \text{ cfh} = 19,700 \text{ cfh}$$

With a combustion factor of 23.8, the estimated grain loading is,

$$\frac{2.316 \frac{\text{lb}}{\text{hr}} \times 7000 \frac{\text{gr}}{\text{lb.}}}{23.8 \times 19,700 \text{ cfh gas}} = 0.035 \text{ gr/dscf}$$

This estimated grain loading meets the 0.05 gr/dscf requirement of Section 9.09 (c).